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10/537,287	11/10/2006	Shigeru Tomisato	273180US90PCT	1852

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EXAMINER	
KAO, JUTAI	

ART UNIT	PAPER NUMBER
2416	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/537,287	TOMISATO ET AL.	
	Examiner	Art Unit	
	JUTAI KAO	2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4, 8, 9 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petsko (US 6,535,066) in views of Awater (US 6,175,551) and Higgins (US 6,266,633).

Petsko discloses a dynamic RF amplifier including the following features.

Regarding claim 1, an orthogonal frequency multi-carrier transmitting apparatus (see (“OFDM”) transmitter recited in the abstract) which arranges symbols to be transmitted on the frequency axis as plural sub-carrier signal components of a frequency interval equal to the symbol rate (see multiple inputs symbols sent to the

IFFT processor 12 in Fig. 1), then converts them to time domain signals (see output of IFFT processor, wherein IFFT is performed to convert signals into time-domain signals), then up converts these signals and amplifies their power (see upconversion block 22 and power amplifier block 24 in Fig. 1), thereafter transmitting them (output of PA 24 being transmitted in Fig. 1).

Regarding claim 9, an orthogonal frequency multi-carrier transmitting method (see ("OFDM") transmitter recited in the abstract) which arranges plural symbols to be transmitted on the frequency axis as plural sub-carrier signal components of a frequency interval equal to the symbol rate (see multiple inputs symbols sent to the IFFT processor 12 in Fig. 1), then converts them to time domain signals (see output of IFFT processor, wherein IFFT is performed to convert signals into time-domain signals), then up converts these signals and amplifies their power (see upconversion block 22 and power amplifier block 24 in Fig. 1), thereafter transmitting them (output of PA 24 being transmitted in Fig. 1).

Petsko does not explicitly disclose the following features: regarding claim 1, an inverse Fourier transform part which transform said plural sub-carrier signal components to plural time domain signal components; a peak component detecting part which compares each of said plural time domain signals with a predetermined permissible peak level to detect peak components exceeding said permissible peak level; a Fourier transform part which transforms said peak components to frequency domain components corresponding to said sub-carrier signal components; and subtracting means which subtract said frequency domain components from said plural

sub-carrier signal components to be input to said inverse Fourier transform part, thereby suppressing the peak component of the transmitting output; regarding claim 2, wherein said peak component detecting part sets said peak components at zero when the levels of the time domain signal components output from said subtracting means are equal to or lower than said permissible peak level, and uses the differences between said time domain signal components and said permissible peak level as said peak components when the level of said time domain signal components exceeds said permissible peak level; regarding claim 3, wherein a permissible peak level setting part is provided which determines said permissible peak level in accordance with the level of the power-amplified transmitting signal; regarding claim 4 and 12, a Fourier-transformed output signal control part which compares the level of each of said frequency domain components from said Fourier transform part with a predetermined peak-reduced signal permissible level, and controls the level of said each frequency domain component to become equal to or lower than said peak-reduced signal permissible level; regarding claim 8, 11, 13, 14 and 15, wherein a set of said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is formed by a memory in which there are stored time domain signal components that are obtained when peak reduction processing by said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is performed in advance for each possible combination of the respective sub-carrier components until peak components become equal to or lower than said permissible peak level; regarding claim 9, a step of performing inverse Fourier transform

processing of said plural sub-carrier signal components to transform them to plural time domain signal components; a step of comparing each of said plural time domain signal components with a predetermined permissible peak level to detect peak components exceeding said permissible peak level; a step of Fourier-transforming said peak components to frequency domain components corresponding to said sub-carrier signal components; and a step of subtracting said frequency domain components from said plural sub-carrier signal components to thereby suppress the peak component of a transmitting output.

Awater discloses a transmission system employing peak cancellation including the following features.

Regarding claim 1, an inverse Fourier transform part which transform said plural sub-carrier signal components to plural time domain signal components (see IFFT 28 in Fig. 4, which converts the signal to time domain, see “transforming the signal back to the time domain…” recited in column 5, line 5); a peak component detecting part which compares each of said plural time domain signals with a predetermined permissible peak level to detect peak components exceeding said permissible peak level (see peak detection unit 52 in Fig. 4; see “peak detector 52 detects which samples exceed some predefined amplitude…” recited in column 4, lines 61-62); a Fourier transform part which transforms said peak components to frequency domain components corresponding to said sub-carrier signal components (see FFT 58 in Fig. 4).

Regarding claim 9, a step of performing inverse Fourier transform processing of said plural sub-carrier signal components to transform them to plural time domain signal

components(see IFFT 28 in Fig. 4, which converts the signal to time domain, see “transforming the signal back to the time domain…” recited in column 5, line 5); a step of comparing each of said plural time domain signal components with a predetermined permissible peak level to detect peak components exceeding said permissible peak level (see peak detection unit 52 in Fig. 4; see “peak detector 52 detects which samples exceed some predefined amplitude…” recited in column 4, lines 61-62); a step of Fourier-transforming said peak components to frequency domain components corresponding to said sub-carrier signal components (see FFT 58 in Fig. 4).

Higgins discloses a noise suppression method including the following features.

Regarding claim 1, subtracting means which subtract said frequency domain components from said plural sub-carrier signal components to be input to said inverse Fourier transform part, thereby suppressing the peak component of the transmitting output (see “for which the magnitude at frequency f exceeds the noise floor...Spectral subtraction (SS) module” recited in column 7, lines 54-67).

Regarding claim 2, wherein said peak component detecting part sets said peak components at zero when the levels of the time domain signal components output from said subtracting means are equal to or lower than said permissible peak level (see “setting any negative results to zero…” recited in column 8, line 58), and uses the differences between said time domain signal components and said permissible peak level as said peak components when the level of said time domain signal components exceeds said permissible peak level (see “subtracting from..." recited in column 8, lines 55-67).

Regarding claim 3, wherein a permissible peak level setting part is provided which determines said permissible peak level in accordance with the level of the power-amplified transmitting signal (see “magnitude spectra are used to estimate the noise floor for spectral subtraction..." recited in column 5, lines 49-50).

Regarding claim 4 and 12, a Fourier-transformed output signal control part which compares the level of each of said frequency domain components from said Fourier transform part (see FFT module 60 and its outputs in Fig. 2A) with a predetermined peak-reduced signal permissible level (see “noise floor” recited in column 5, lines 49-50), and controls the level of said each frequency domain component to become equal to or lower than said peak-reduced signal permissible level (see “for which the magnitude at frequency f exceeds the noise floor...Spectral subtraction (SS) module” recited in column 7, lines 54-67).

Regarding claim 8, 11, 13, 14, 15 and 19, wherein a set of said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is formed by a memory in which there are stored time domain signal components that are obtained when peak reduction processing by said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is performed in advance for each possible combination of the respective sub-carrier components until peak components become equal to or lower than said permissible peak level (see “memory 14” recited in column 7, line 9; see "...spectral magnitudes...computed and stored..." recited in column 8, lines 41-62; see "...stored in memory 14..." recited in“ column 8 lines 63 to column 9, lines 28).

Regarding claim 9, a step of subtracting said frequency domain components from said plural sub-carrier signal components to thereby suppress the peak component of a transmitting output (see “for which the magnitude at frequency f exceeds the noise floor...Spectral subtraction (SS) module” recited in column 7, lines 54-67).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Petsko using features, as taught by Awater and Higgins, in order to perform noise peak reduction of the signals to be transmitted.

4. Claims 5 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petsko, Awater and Higgins as applied to claim 1 above, and further in view of Yang (US 2003/0210647).

Petsko, Awater and Higgins disclose the claimed limitations as shown above.

Higgins also discloses the following features.

Regarding claim 16, wherein a set of said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is formed by a memory in which there are stored time domain signal components that are obtained when peak reduction processing by said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is performed in advance for each possible combination of the respective sub-carrier components until peak components become equal to or lower than said permissible peak level (see “memory 14” recited in column 7, line 9; see "...spectral

magnitudes...computed and stored..." recited in column 8, lines 41-62; see "...stored in memory 14..." recited in“ column 8 lines 63 to column 9, lines 28).

Petsko, Awater and Higgins do not disclose the following features: regarding claim 5, plural copying parts each of which copies one of said plural symbols to a number SF that is equal to the value of a spreading factor, said SF being an integer equal to or greater than 1; a spreading code generating part which generates spreading codes; and multiplying means which spread the outputs from said plural copying parts by said spreading codes and outputs the spread results as said plural sub-carrier signal components.

Yang discloses a method for generating 2D OVSF codes in multicarrier DS-CDMA systems including the following features.

Regarding claim 5, plural copying parts each of which copies one of said plural symbols to a number SF that is equal to the value of a spreading factor, said SF being an integer equal to or greater than 1 (see “The number of columns in the matrix indicates the spreading factor…” recited in paragraph [0006], wherein the number of columns must be an integer greater than or equal to 1); a spreading code generating part which generates spreading codes (see “spreading code sequence…” recited in paragraph [0006] and see MXN spreading code matrix generator 52 in Fig. 8); and multiplying means which spread the outputs from said plural copying parts by said spreading codes and outputs the spread results as said plural sub-carrier signal components (see “multiplier 14…” recited in paragraph [0006]).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Petsko, Awater and Higgins using features, as taught by Yang, in order to spread the transmission spectrum while ensuring orthogonality of the transmitted signals.

5. Claims 6-7 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petsko, Awater and Higgins as applied to claim 1 above, and further in view of Yang and Nakamura (US 2002/0136278).

Petsko, Awater and Higgins disclose the claimed limitations as shown above.

Higgins also discloses the following features.

Regarding claims 17 and 18, wherein a set of said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is formed by a memory in which there are stored time domain signal components that are obtained when peak reduction processing by said inverse Fourier transform part, said peak component detecting part, said Fourier transform part and said subtracting means is performed in advance for each possible combination of the respective sub-carrier components until peak components become equal to or lower than said permissible peak level (see “memory 14” recited in column 7, line 9; see "...spectral magnitudes...computed and stored..." recited in column 8, lines 41-62; see "...stored in memory 14..." recited in“ column 8 lines 63 to column 9, lines 28).

Petsko, Awater and Higgins do not disclose the following features: regarding claim 6, plural copying parts each of which copies one of said plural symbols to a

number SF that is equal to the value of a spreading factor, said SF being an integer equal to or greater than 1; a spreading code generating part which generates spreading codes; multiplying means which spread the outputs from said plural copying parts by said spreading codes and outputs the spread results as said plural sub-carrier signal components; and a combining part which combines corresponding components of the outputs from the respective multiplying means of said plural routes and outputs the combined components as sub-carrier signal components of said plural routes; regarding claim 7, wherein said spreading code generating part generates a short code as said spreading code; said transmitting apparatus further comprising: a long code generating part which generates a long code; and second multiplying means which multiply the outputs from the combining part by said long code and output multiplication results as said plural sub-carrier signal components.

Yang discloses a method for generating 2D OVSF codes in multicarrier DS-CDMA systems including the following features.

Regarding claim 6, plural copying parts each of which copies one of said plural symbols to a number SF that is equal to the value of a spreading factor, said SF being an integer equal to or greater than 1 (see “The number of columns in the matrix indicates the spreading factor…” recited in paragraph [0006], wherein the number of columns must be an integer greater than or equal to 1); a spreading code generating part which generates spreading codes (see “spreading code sequence…” recited in paragraph [0006] and see MXN spreading code matrix generator 52 in Fig. 8); and multiplying means which spread the outputs from said plural copying parts by said

spreading codes and outputs the spread results as said plural sub-carrier signal components (see “multiplier 14…” recited in paragraph [0006]).

Nakamura discloses a spread-spectrum signal receiver including the following features.

Regarding claim 6, the system further comprises a combining part which combines corresponding components of the outputs from the respective multiplying means of said plural routes and outputs the combined components as sub-carrier signal components of said plural routes (see “combiner” recited in paragraph [0014], combiners 201e, 201f in Fig. 1 and 4; 402a, 402b in Fig. 3).

Regarding claim 7, wherein said spreading code generating part generates a short code as said spreading code (see “channel identification code (short code)” recited in paragraph [0003]); said transmitting apparatus further comprising: a long code generating part which generates a long code (see “user identification code (long code)” recited in paragraph [0003]); and second multiplying means which multiply the outputs from the combining part by said long code and output multiplication results as said plural sub-carrier signal components (see “multiplying a user identification code (long code) and a channel identification code (short code)" recited in paragraph [0003]; multiplying the codes and the claimed method of multiplying one code with the outputs then multiplies the result with the second code yields the same result, therefore Nakamura's method is equivalent to the claimed multiplication method).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Petsko, Awater and Higgins using features, as taught

by Yang and Nakamura, in order to spread the transmission spectrum while ensuring orthogonality of the transmitted signals.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Petsko, Awater and Higgins as applied to claim 9 above, and further in view of Taunton (US 2007/0053458).

Petsko, Awater and Higgins disclose the claimed limitations as shown above.

Petsko, Awater and Higgins do not disclose the following features: regarding claim 10, wherein said steps (a), (b) and (c) are repeatedly performed until the levels of all of said plural time domain signal components become equal to or lower than said permissible peak level in aid step (b).

Taunton discloses a multi-tone transmission method including the following features.

Regarding claim 10, wherein said steps (a), (b) and (c) are repeatedly performed until the levels of all of said plural time domain signal components become equal to or lower than said permissible peak level in aid step (b) (see “If the peak amplitude remains too high a further regeneration attempt, or attempts, may be made..." recited in paragraph [0068]; that is, Petsko, Awater and Higgins, which shows the step of modifying the peak components, is equivalent to the regeneration of symbols in Taunton’s invention, therefore, as the peak amplitude remains too high after the claimed steps a-c (which are shown by Petsko, Awater and Higgins), another regeneration attempt is performed until the best symbol could be generated).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Petsko, Awater and Higgins using features, as taught by Taunton, in order to reduce the signal noise to the minimum level.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUTAI KAO whose telephone number is (571)272-9719. The examiner can normally be reached on Monday ~Friday 7:30 AM ~5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kwang Yao can be reached on (571)272-3182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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